ARIZ 512a
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(4 Pages)

RESIDUE BY EVAPORATION

(An Arizona Method)

SCOPE

1. (a) This method describes a rapid procedure for determining the percent of asphaltic residue in all types of emulsified bituminous materials.

(b) This test method may involve hazardous material, operations, or equipment. This test method does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user to consult and establish appropriate safety and health practices and determine the applicability of any regulatory limitations prior to use.

(c) See Appendix A1 of the Materials Testing Manual for information regarding the procedure to be used for rounding numbers to the required degree of accuracy.

(d) Metric (SI) units and values are shown in this test method with English units and values following in parentheses. Values given for metric and English units may be numerically equivalent (soft converted) for the associated units, or they may be given as rounded or rationalized values (hard converted). Either the metric or English units along with their corresponding values shall be used in accordance with applicable specifications. See Appendix A2 of the Materials Testing Manual for additional information on the metric system.

APPARATUS

2. Requirements for the frequency of equipment calibration and verification are found in Appendix A3 of the Materials Testing Manual. Apparatus for this test procedure shall consist of the following:

(a) Small glass beaker or similar container.

(b) Ointment tins [180 mL (6 oz.)].

(c) Hot plate capable of maintaining temperatures of 163 °C (325 °F) maximum.

(d) Glass or metal stirring rod.

(e) A balance or scale capable of measuring the maximum weight to be determined and conforming to the requirements of AASHTO M 231, except the readability and sensitivity of any balance or scale utilized shall be at least 0.01 gram.

PRECAUTION

3. Care must be exercised in the use of apparatus and the handling of the tin so that material is neither lost nor additional material picked up. The use of the ointment tin lid serves as well as a clean place for resting the tin.

PROCEDURE

4. (a) Thoroughly mix the sample using stirring rod.

NOTE: It is very important that the sample be completely mixed, making certain to mix material clinging to bottom and sides of container into sample. A sample that has "separated" may be rendered homogeneous through continued stirring Never mix the sample by shaking. If a sample is received which has "broken", it shall be discarded and another sample obtained for testing.

(b) Pour approximately 25 grams of the mixed material into the glass beaker or similar container.

(c) Record weight of a 180 mL (6 oz.) ointment tin to the nearest 0.01 gram and place 5 ± 0.3 grams of material into the tin. Record weight of material in tin to the nearest 0.01 gram, as "A".

(d) Repeat procedure in paragraph (c) for 2 additional samples.

(e) Place the three samples on hot plate and slowly heat to a temperature that will prevent spattering or overcooking. [See Note following paragraph (g)].

(f) Heat samples at this temperature until the residue stops bubbling and appears smooth. This is an indication that the sample is nearing the end point (complete removal of water).

NOTE: Air bubbles should be removed occasionally by tapping tin on the hot plate or other hard surface and rotating the sample around the bottom of the tin. (Use of tongs or needle-nose pliers to handle tin is recommended.)

(g) Raise the temperature of samples to 163 °C (325 °F) maximum. This may be accomplished by raising the temperature of the hot plate or by placing samples on another hot plate. If an additional hot plate is used and bubbling occurs the samples shall be placed back on the lower temperature hot plate for a short period of time and then returned to the higher temperature hot plate.

NOTE: The temperatures required vary with the type of material being tested. When testing the "ERA" grade materials and emulsions with low viscosities the temperatures used will normally be near the boiling point of water. When testing higher viscosity materials the temperatures may approach the 163 °C (325 °F) maximum allowed. Care must be exercised for all materials to prevent spattering and overheating.

(h) Heat the samples until the first indication of smoking is detected, which shall be the determination of the removal of all water. (The use of a black background is useful in observing the point of smoking.)

NOTE: When testing "ERA - 1" grade materials, the determination of end point described in paragraph (h) shall not be used, rather when the material is free of all bubbles and has a completely translucent appearance.

(i) Remove samples from hot plate and allow to cool.

(j) Record the weight of each sample to the nearest 0.01 gram, as "B".

CALCULATION

5. (a) Determine percent residue of each sample by the equation below, and record results to the nearest 0.01%:

$$\text{Percent Residue} = \frac{B}{A} \times 100$$

Where: A = Weight of Sample Before Heating
B = Weight of Sample After Heating

Example:

$$\%\ \text{residue} = \frac{3.18}{5.02} \times 100 = 63.35\%$$

(b) Determine the average percent residue of the material being tested by the equation below, and record the results to the nearest 0.1%.

$$\text{Average \% Residue} = \frac{(\text{Sum of the 3 individual samples Percent Residue})}{3}$$

Example:

(For 3 samples of 63.35%, 63.51%, and 63.68% residue)

$$\text{Average \% Residue} = \frac{(63.35 + 63.51 + 63.68)}{3} = 63.5\%$$

REPORT

6. The percent residue shall be reported to the nearest 0.1%.